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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09,745,959	12/21/2000	Mareike Katharine Klee	PHD 99,195	2130

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EXAMINER

TAKAOKA, DEAN O

ART UNIT

PAPER NUMBER

2817

DATE MAILED: 09/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/745,959

Applicant(s)

LOBL ET AL.

Examiner

Dean O Takaoka

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-8 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8 and 13-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:

2) ☐ Certified copies of the priority documents have been received in Application No. _____.

3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 recites the limitation "where the carrier layer is removed **mechanically**" in page 2 of the Amendment dated September 10, 2002. There is insufficient antecedent basis for this limitation in the claim.

It is the position of the Examiner that a mere recitation in the specification for the phrase above (e.g. page 9, lines 14-15) without detailed explanation with respect to the process makes the claim indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, thus there is insufficient antecedent basis for this limitation in the claim.

Claim 16 recites the limitation "where the carrier layer is removed **chemically**" in page 2 of the Amendment dated September 10, 2002. There is insufficient antecedent basis for this limitation in the claim.

It is the position of the Examiner that a mere recitation in the specification for the phrase above (e.g. page 9, lines 14-15) without detailed explanation with respect to the process makes the claim indefinite for failing to particularly point out and distinctly claim

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the subject matter which applicant regards as the invention, thus there is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4 – 8 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ella (U.S. Patent No. 5,910,756).

Claim 1:

Ella shows a filter arrangement which comprises a substrate (illustrated by substrate 36, best shown in Figs. 1a, et al.) on which are provided a bandpass filter (e.g. SCF 4 shown in Fig. 10a with respect to Fig. 10c) for generating a passband and a notch filter (e.g. BAW 2 and/or 3 shown in Fig. 10a with respect to Fig. 10b where BAW 2 and 3 create a notch above and below the passband of the BPF SCF 4 – col. 22, line 61 – col. 23, line 15 where the upper passband edge notch is created by BAW 3 and the lower passband edge notch is created by BAW 2), in which the filters are coupled to one another (shown in Fig. 10a connected to one another) and functionally independent from one another (discussed above in view of Figs. 10a and 10b – col. 22, line 61 thru col.

passband edge notch is created by BAW 2 thus function independently from one another, e.g. in that BAW 2 serves one function as the lower passband edge notch and BAW 3 serves another function as the upper passband edge notch).

Claim 2:

The notch filter is connected between the input of the bandpass filter and ground (where the duplexer comprises Tx and Rx band pass filter sections, each having a notches at the upper and lower frequency response and between ground, ground shown between nodes G3 and G4 – Fig. 13)

Claims 4 and 5:

The band pass filter comprises a filter arrangement of resonators;

Where the filter arrangement of resonators comprise bulk acoustic wave resonators (where the BAWR's are resonators).

Claim 6:

Where the bulk acoustic wave resonator comprises a resonator unit and a reflection element which is arranged between the substrate and the resonator unit (where an air gap created by the removal of sacrificial layer 39 – Fig. 2) lies between the substrate (36) and resonator element and inherently creates a reflection element).

Claim 7:

Where the notch filter comprises a capacitor and inductance (where Ella shows the inductance of the resonator by the equivalent resonant circuit shown in Fig. 10e, further where the capacitor is inherently shown by the individual structure of the BAWR for example in Fig. 2 where the first (24) and second (26) electrodes sandwich piezoelectric element (22) thus inherently comprising a capacitor).

Claim 8:

A method of manufacturing a filter arrangement (e.g. the method being inherent in that Ella shows a final product, the final product inherently made by a method) which

comprises a substrate (36) and provided thereon a bandpass filter of bulk acoustic wave resonators and a notch filter (e.g. Fig. 10a-c in view of Fig. 13, Fig. 13 showing a duplexer arrangement with multiple individual resonator elements combined in a duplexing circuit, where the bandpass filter and notch filter are discussed above in the reasons for rejection of claim 1) by which method a second electrode, a piezoelectric layer and a first electrode are provided on a carrier layer (best illustrated in Fig. 2 where the first (24) and second (26) electrodes and piezoelectric layer (22) are provided on carrier layer (39 – sacrificial layer) and are structured such that at least one resonator unit, a capacitor and an inductance are created (e.g. in that electrodes layers 24 and 26 of the resonator of Fig. 3a inherently creates a capacitance, further that the equivalent circuit diagram of any given resonator is shown by Fig. 10e inherently having an inductance, shown in resonator equivalent units 2', 3a', and 4b', thus at least one resonator unit, a capacitor and an inductance are created, albeit within the same unit, or in the alternative with each resonator unit shown by Fig. 10d with three resonators), a substrate (36) is fastened on the entire assembly and the carrier layer is removed.

Claim 13:

The bandpass filter and the notch filter are thin film filters (spec all and in particular col. 11, lines 51-60 and col. 13, lines 42-50).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ella ('756) as applied to claim 1 above, and further in view of Ella (U.S. Patent No. 5,714,917).

Claim 14:

Ella ('756) shows the method of manufacturing (discussed in the reasons for rejection of claim 8 above), comprising a substrate and provided on the substrate a BAW bandpass filter and a notch filter including a well-known carrier layer.

Ella ('756) does not explicitly disclose the material of the well-known carrier layer (39 – Fig. 2).

Ella ('917) teaches the BAW resonator with a well-known sacrificial layer (39 – Fig. 20, the sacrificial layer defined by the Examiner as being the carrier layer) where the carrier layer consists of a well-known art-recognized equivalent ceramic material ZnO (where the sacrificial material is disclosed as a ceramic material ZnO, spec all and in particular col. 3, lines 5 – 25 where the ZnO layer is first formed on the substrate, thus being the sacrificial layer, and then removed to form an air gap, further where col. 9, line 50 to col. 11, line 55 discloses the ZnO sacrificial layer 44 shown in Figs. 15a-d and 62 shown in Figs. 19a-c being the ZnO sacrificial layer).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the well-known carrier layer using generic material disclosed by Ella ('756) with the carrier layer using well-known art-recognized equivalent ceramic ZnO material disclosed by Ella ('917). Such a substitution would

have been a mere substitution of well-known carrier layer materials, substituting the generic material with the well-known art-recognized equivalent ZnO ceramic material of thus suggesting the obviousness of the modification.

Response to Arguments

Applicant's arguments filed September 10, 2002 have been fully considered but they are not persuasive.

The Examiner acknowledges the RCE in response to the Final Office Action dated June 6, 2002.

The Examiner acknowledges the Applicant's arguments to which the applicant believes the current invention is patentably distinct. Amended claim 1 further defines the present invention by the notch filter and bandpass filter functionally independent from one another, the bandpass filter generating a passband and the notch filter creating the notch. It is further argued that because the notch and bandpass filters are independently designed, they can be more independently designed with less interference.

It is the position of the Examiner that the bandpass filter (4 – Fig. 10a in view of Fig. 10a) of Ella ('756) shows the SCF (4 – stacked crystal filter) being a bandpass filter for the pass band while BAW (2 and 3) are the notch filters for the high and low frequency notches of the passband (as disclosed by Ella – col. 22, line 61 – col. 23, line 15 where the upper passband edge notch is created by BAW 3 and the lower passband edge notch is created by BAW 2). Therefore not only are the individual elements of Ella separate (e.g. resonators 2, 3 and 4), but also may be designed independently (in that

while a Tx or Rx unit is a complete unit in itself comprising multiple resonators, such as shown by Ella in duplexer of Fig. 13, the individual resonators comprising each of the Tx or Rx sections may be designed independently while fabricated together, e.g. in that each resonator would have to be designed independently for final fabrication, albeit the final fabrication is the complete Tx or Rx unit together).

While it is argued that the resonators of Ella work in conjunction with each other (e.g. series and parallel connected resonators), further where the BAW resonators work for the passband as well as forming the notches, it is argued that Ella does not teach or imply that the notch filter is functionally independent of the band pass filter to which the Examiner disagrees.

It is the position of the Examiner that multi-stage filters (e.g. 2, 3, etc. element filters) are well-known. Further that the additional of elements not only enhance the passband attenuation (e.g. in common terminology, creating tighter skirts or passband attenuation) but also creating notches, thus the addition of each resonator filter enhances the attenuation by creating the notch which is what notch of the current invention accomplishes. It appears that while the current invention appears to be structurally different, the resonator, L and C all appear to be made on the same structural substrate (e.g. Fig. 1) thus both the prior art of Ella (e.g. Tx or Rx unit sections) and the current invention appear manufactured with the different units together.

The Examiner acknowledges and accepts the drawing amendment with respect to claim 8 of the previous Office Action dated June 5, 2002 however, allowability

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indicated in the previous Office Action dated June 5, 2002 is withdrawn and a rejection based on the prior art of Ella is now applied.

Conclusion

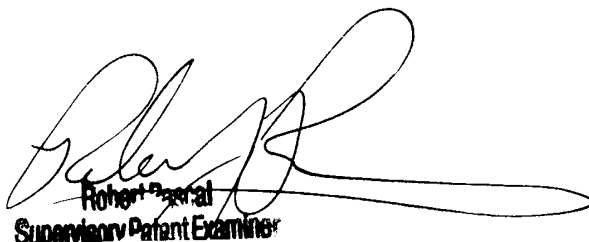
Due to the indefinite nature of claims 15 and 16, no art has been applied.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dean O Takaoka whose telephone number is (703) 305-6242. The examiner can normally be reached on 8:30a - 5:00p Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (703) 308-4909. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6251 for regular communications and (703) 308-6251 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

dot
September 16, 2002


Robert Pascal
Supervisory Patent Examiner